REMARKS

Applicant acknowledges receipt of the Office Action mailed April 15, 2008.

In the Office Action, the Examiner objected to claim 7; rejected claims 1, 5, 7-9, 15, 16, 18, 19, 23, 24, and 26-28 under 35 U.S.C. § 103(a) as being unpatentable over *Umetani et al.* (U.S. Patent No. 5,171,348) in view of *Roffman et al.* (U.S. Patent No. 5,861,114) and *Oomen* (U.S. Patent No. 5,078,551); rejected claims 1, 5, 7, 23, 24, and 26-28 under 35 U.S.C. § 103(a) as being unpatentable over *Umetani* in view of *Roffman* and *Meyers et al.* (U.S. Patent No. 5,638,212); rejected claims 1, 7-9, 15, 16, 23, 24, and 26-28 under 35 U.S.C. § 103(a) as being unpatentable over *Uno et al.* (U.S. Patent No. 5,008,002) in view of *Roffman* and *Oomen*; rejected claim 6 under 35 U.S.C. § 103(a) as being unpatentable over *Umetani* in view of *Roffman* and *Oomen*, and further in view of *Border et al.* (U.S. Patent Pub. No. 2003/0127759); rejected claim 6 under 35 U.S.C. § 103(a) as being unpatentable over *Umetani* in view of *Roffman* and *Meyers*, and further in view of *Border*; and rejected claims 8, 9, 15, 16, 18, and 19 under 35 U.S.C. § 103(a) as being unpatentable over *Umetani* in view of *Roffman* and *Meyers*, and further in view of *Yoshihiro et al.* (U.S. Patent No. 6,913,424).

By this Amendment, Applicant amends claims 1, 8, and 27, and cancels claims 7 and 26, without prejudice or disclaimer. Upon entry of this Amendment, claims 1, 2, 5, 6, 8, 9, 11-16, 18-24, and 27-31 will remain pending, with claims 2, 11-14, 20-22, and 29-31 withdrawn from examination. Of the claims under examination, claim 1 is independent.

The originally-filed specification, claims, abstract, and drawings fully support the amendments to claims 1, 8, and 27. No new matter has been introduced.

Applicant traverses the rejections above and respectfully requests reconsideration for at least the reasons set forth below.

I. OBJECTIONS TO THE CLAIMS

Claim 7 stands objected to under 37 C.F.R. 1.75(c) as allegedly being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant respectfully submits that the objection to claim 7 has been rendered moot by the cancellation of claim 7. Applicant therefore requests that the objection to claim 7 be withdrawn.

II. 35 U.S.C. § 103(a) REJECTIONS

Applicant traverses the Examiner's rejection of claims 1, 5, 7-9, 15, 16, 18, 19, 23, 24, and 26-28 under 35 U.S.C. § 103(a) as being unpatentable over *Umetani* in view of *Roffman* and *Oomen*. Applicant respectfully submits that independent claim 1 is patentably distinguishable over *Umetani*, *Roffman*, and *Oomen* at least for the reasons described below. Applicant further submits that the rejection of claims 7 and 26 has been rendered moot by the cancellation of claims 7 and 26.

In order to establish a *prima facie* case of obviousness under 35 U.S.C. §103(a), the prior art references (separately or in combination) must teach or suggest all the claim limitations. *See* M.P.E.P. § 2142, 8th Ed., Rev. 5 (August 2006). "[I]n formulating a rejection under 35 U.S.C. § 103(a) based upon a combination of prior art elements, it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed." *USPTO Memorandum* from Margaret A. Focarino, Deputy Commissioner for Patent Operations, May 3, 2007, p. 2. "[T]he analysis supporting a rejection ... should be made explicit" and it is

"important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements in the manner claimed." Id. (citing *KSR Int'l Co. v. Teleflex, Inc.*, No. 04-1350 (U.S. Apr. 30, 2007)).

Umetani appears to disclose a die for press-molding an optical element with high precision. The molding die includes a base material excellent in heat resistance, heat shock resistance, and strength at high temperature; an intermediate layer made of an Ni-P or Ni-B alloy thin film excellent in grinding processability and cutting processability, formed on the base material; and a surface protective layer made of a metal thin film stable both thermally and chemically at high temperature. (*Umetani*, col. 2, line 68 - col. 3, line 8). The hardness of the Ni-P and Ni-B material ranges from a Vickers HV of 500-1000. (*Umetani*, Table 2).

As admitted by the Examiner, "Umetani et al. do not teach cutting in to a depth of less than 1 um with a fixed single point diamond cutting tool." (*Office Action*, p. 3, ll. 20-21). *Umetani* also fails to disclose a method of forming a die surface comprising bringing a cutting tool to come in contact with a material so as to cut the material, wherein the material is one of a ceramic and a tungsten carbide cobalt alloy and has a hardness not smaller than Rockwell hardness HRA 80 or Vickers hardness Hv 1000. In fact, *Umetani* teaches away from using a ceramic material in col. 1, lines 34-49, and instead discloses using an intermediate layer made of an Ni-P or Ni-B alloy, stating that "since these dies [(SiC) and (Si_3N_4), which are ceramics,] are very hard, or excellent in mechanical strength, the diamond tool used for machining the dies is worn out quickly, which makes it difficult to machine the dies precisely."

Accordingly, in order to cure the deficiencies of *Umetani*, the Examiner relies on *Roffman* and *Oomen* and asserts that "Roffman et al. teach a method of cutting dies/molds for forming complex optical surfaces wherein a single point diamond lathe having submicron precision and repeatability is employed . . ." (*Office Action*, p. 3, ll. 21-23); and "Oomen . . . disclose[s] a diamond lathe wherein the cutting point is fixed while the workpiece moves" (*Id.* at p. 4, ll. 4-5).

Roffman appears to disclose a method of manufacturing complex optical designs in soft contact lenses using diamond point turning to machine contact lens blanks without the need for polishing the lens. The diamond lathes provide an accuracy of 20 nm and a resolution of 10 nm with an absolute shape accuracy that is better than 1 micron. (*Roffman*, col. 24, ll. 55-60). Moreover, *Roffman* appears to disclose using stainless steel as an insert of a die. (*Id.* at col. 8, ll. 35-37).

Roffman, however, does not disclose any specific cutting techniques. For example, *Roffman* fails to teach or suggest a method of forming a die surface onto a producing die to produce an optical element, wherein the cutting step is conducted while a cutting tool is set such that a single point of a cutting edge comes in contact with a material as a cutting point, and the cutting point of the cutting edge is fixed at the single point. Furthermore, *Roffman* fails to disclose a method of forming a die surface comprising bringing a cutting tool to come in contact with a material so as to cut the material, wherein the material is one of a ceramic and a tungsten carbide cobalt alloy having a hardness not smaller than Rockwell hardness HRA 80 or Vickers hardness Hv 1000.

Oomen appears to disclose a diamond tool 1 comprising a tool tip 5 of boron-containing single-crystal diamond. (*Oomen*, Abstract).

Oomen, however, does not disclose any specific cutting techniques. For example, *Oomen* fails to teach or suggest a method of forming a die surface onto a producing die to produce an optical element, wherein the cutting step is conducted while a cutting tool is set such that a single point of a cutting edge comes in contact with a material as a cutting point, and the cutting point of the cutting edge is fixed at the single point. Furthermore, *Oomen* fails to disclose a method of forming a die surface comprising bringing a cutting tool to come in contact with a material so as to cut the material, wherein the material is one of a ceramic and a tungsten carbide cobalt alloy having a hardness not smaller than Rockwell hardness HRA 80 or Vickers hardness Hv 1000.

Accordingly, with respect to independent claim 1, *Umetani*, *Roffman*, and *Oomen* fail to teach Applicant's claimed combination, including, *inter alia*:

> [a] method of forming a die surface . . . , the method comprising the steps of: bringing a cutting tool to come in contact with a material so as to cut the material . . . ;
>
> wherein the material is one of a ceramic and a tungsten carbide cobalt alloy and has a hardness not smaller than Rockwell hardness HRA 80 or Vickers hardness Hv 1000 and the cutting step is conducted to cut the material with a cutting-in depth of 1 μm or less, and
>
> wherein the cutting tool has a cutting edge capable of coming in contact with the material, the cutting edge comprises a diamond and the cutting step is conducted while the cutting tool is set such that a single point of the cutting edge comes in contact with the material as a cutting point, and the cutting point of the cutting edge is fixed at the single point (emphases added).

For at least the foregoing reasons, a *prima facie* case of obviousness has not been established with respect to independent claim 1. Accordingly, independent claim 1, and claims 5, 8, 9, 15, 16, 18, 19, 23, 24, 27, and 28 which depend from claim 1, are patentable over *Umetani*, *Roffman*, and *Oomen*. Applicant therefore requests that the rejection of claims 1, 5, 7-9, 15, 16, 18, 19, 23, 24, and 26-28 under 35 U.S.C. § 103(a) be withdrawn.

Applicant traverses the Examiner's rejection of claims 1, 5, 7, 23, 24, and 26-28 under 35 U.S.C. § 103(a) as being unpatentable over *Umetani* in view of *Roffman* and *Meyers*. Applicant respectfully submits that independent claim 1 is patentably distinguishable over *Umetani*, *Roffman*, and *Meyers* at least for the reasons described below. Applicant further submits that the rejection of claims 7 and 26 has been rendered moot by the cancellation of claims 7 and 26.

As admitted by the Examiner and discussed above, "Umetani et al. do not teach cutting in to a depth of less than 1 um with a fixed single point diamond cutting tool." (*Office Action*, p. 3, ll. 20-21). *Umetani* also fails to disclose a method of forming a die surface comprising bringing a cutting tool to come in contact with a material so as to cut the material, wherein the material is one of a ceramic and a tungsten carbide cobalt alloy and has a hardness not smaller than Rockwell hardness HRA 80 or Vickers hardness Hv 1000.

Accordingly, in order to cure the deficiencies of *Umetani*, the Examiner relies on *Roffman* and *Meyers* and asserts that "Roffman et al. teach a method of cutting dies/molds for forming complex optical surfaces wherein a single point diamond lathe

having submicron precision and repeatability is employed . . ." (*Office Action*, p. 6, ll. 2-4); and "Meyers et al. . . disclose a diamond lathe wherein the cutting point is fixed while the workpiece moves" (*Id.* at p. 6, ll. 10-11).

As discussed above, *Roffman* does not disclose any specific cutting techniques. For example, *Roffman* fails to teach or suggest a method of forming a die surface onto a producing die to produce an optical element, wherein the cutting step is conducted while a cutting tool is set such that a single point of a cutting edge comes in contact with a material as a cutting point, and the cutting point of the cutting edge is fixed at the single point. Furthermore, *Roffman* fails to disclose a method of forming a die surface comprising bringing a cutting tool to come in contact with a material so as to cut the material, wherein the material is one of a ceramic and a tungsten carbide cobalt alloy and has a hardness not smaller than Rockwell hardness HRA 80 or Vickers hardness Hv 1000.

Meyers appears to disclose a method of manufacturing a diffractive surface comprising rotating a surface to be cut, translating a cutting tip at a low speed, and cutting the surface with the cutting tip. (*Meyers*, Abstract).

Meyers, however, does not disclose a method of forming a die surface comprising bringing a cutting tool to come in contact with a material so as to cut the material, wherein the material is one of a ceramic and a tungsten carbide cobalt alloy and has a hardness not smaller than Rockwell hardness HRA 80 or Vickers hardness Hv 1000.

Accordingly, with respect to independent claim 1, *Umetani*, *Roffman*, and *Meyers* fail to teach Applicant's claimed combination, including, *inter alia*:

> [a] method of forming a die surface . . . , the method comprising the steps of: bringing a cutting tool to come in contact with a material so as to cut the material . . . ;
>
> wherein the material is one of a ceramic and a tungsten carbide cobalt alloy and has a hardness not smaller than Rockwell hardness HRA 80 or Vickers hardness Hv 1000 and the cutting step is conducted to cut the material with a cutting-in depth of 1 μm or less, and
>
> wherein the cutting tool has a cutting edge capable of coming in contact with the material, the cutting edge comprises a diamond and the cutting step is conducted while the cutting tool is set such that a single point of the cutting edge comes in contact with the material as a cutting point, and the cutting point of the cutting edge is fixed at the single point (emphases added).

For at least the foregoing reasons, a *prima facie* case of obviousness has not been established with respect to independent claim 1. Accordingly, independent claim 1, and claims 5, 23, 24, 27, and 28 which depend from claim 1, are patentable over *Umetani*, *Roffman*, and *Meyers*. Applicant therefore requests that the rejection of claims 1, 5, 7, 23, 24, and 26-28 under 35 U.S.C. § 103(a) be withdrawn.

Applicant traverses the Examiner's rejection of claims 1, 7-9, 15, 16, 23, 24, and 26-28 under 35 U.S.C. § 103(a) as being unpatentable over *Uno* in view of *Roffman* and *Oomen*. Applicant respectfully submits that independent claim 1 is patentably distinguishable over *Uno*, *Roffman*, and *Oomen* at least for the reasons described below. Applicant further submits that the rejection of claims 7 and 26 has been rendered moot by the cancellation of claims 7 and 26.

Uno appears to disclose a process for producing a mold using an ion plating method, including forming an i-carbon film on a mold base for obtaining a press-molded glass article. (*Uno*, Abstract).

As admitted by the Examiner, "Uno et al. do not teach how deep the cut is into the SiC film or that the cut is made with a single point cutting tool." (*Office Action*, p. 7, ll. 15-16). *Uno* also fails to disclose wherein the cutting step is conducted while the cutting tool is set such that a single point of the cutting edge comes in contact with the material as a cutting point, and the cutting point of the cutting edge is fixed at the single point. Furthermore, *Uno* fails to teach or suggest a method of forming a die surface comprising bringing a cutting tool to come in contact with a material so as to cut the material, wherein the material is one of a ceramic and a tungsten carbide cobalt alloy and has a hardness not smaller than Rockwell hardness HRA 80 or Vickers hardness Hv 1000.

Accordingly, in order to cure the deficiencies of *Uno*, the Examiner relies on *Roffman* and *Oomen* and asserts that "Roffman et al. teach a method of cutting dies/molds for forming complex optical surfaces wherein a single point diamond lathe having submicron precision and repeatability is employed . . ." (*Office Action*, p. 7, ll. 17-19); and "Oomen . . . disclose a diamond lathe wherein the cutting point is fixed while the workpiece moves" (*Id.* at p. 7, ll. 20-22).

As discussed above, *Roffman* does not disclose any special cutting techniques. For example, *Roffman* fails to teach or suggest a method of forming a die surface onto a producing die to produce an optical element, wherein the cutting step is conducted while a cutting tool is set such that a single point of a cutting edge comes in contact with a

material as a cutting point, and the cutting point of the cutting edge is fixed at the single point. Moreover, *Roffman* fails to disclose a method of forming a die surface comprising bringing a cutting tool to come in contact with a material so as to cut the material, wherein the material is one of a ceramic and a tungsten carbide cobalt alloy and has a hardness not smaller than Rockwell hardness HRA 80 or Vickers hardness Hv 1000.

Similarly, as discussed above, *Oomen* does not disclose any specific cutting techniques. For example, *Oomen* fails to teach or suggest a method of forming a die surface onto a producing die to produce an optical element, wherein the cutting step is conducted while a cutting tool is set such that a single point of a cutting edge comes in contact with a material as a cutting point, and the cutting point of the cutting edge is fixed at the single point. Furthermore, *Oomen* fails to disclose a method of forming a die surface comprising bringing a cutting tool to come in contact with a material so as to cut the material, wherein the material is one of a ceramic and a tungsten carbide cobalt alloy having a hardness not smaller than Rockwell hardness HRA 80 or Vickers hardness Hv 1000.

Accordingly, with respect to independent claim 1, *Uno*, *Roffman*, and *Oomen* fail to teach Applicant's claimed combination, including, *inter alia*:

> [a] method of forming a die surface . . . , the method comprising the steps of: bringing a cutting tool to come in contact with a material so as to cut the material . . . ;
>
> wherein the material is one of a ceramic and a tungsten carbide cobalt alloy and has a hardness not smaller than Rockwell hardness HRA 80 or Vickers hardness Hv 1000 and the cutting step is conducted to cut the material with a cutting-in depth of 1 μm or less, and

> wherein the cutting tool has a cutting edge capable of coming in contact with the material, the cutting edge comprises a diamond and the cutting step is conducted while the cutting tool is set such that a single point of the cutting edge comes in contact with the material as a cutting point, and the cutting point of the cutting edge is fixed at the single point (emphases added).

For at least the foregoing reasons, a *prima facie* case of obviousness has not been established with respect to independent claim 1. Accordingly, independent claim 1, and claims 8, 9, 15, 16, 23, 24, 27, and 28 which depend from claim 1, are patentable over *Uno*, *Roffman*, and *Oomen*. Applicant therefore requests that the rejection of claims 1, 7-9, 15, 16, 23, 24, and 26-28 under 35 U.S.C. § 103(a) be withdrawn.

Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Umetani* in view of *Roffman* and *Oomen*, and further in view of *Border*; claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Umetani* in view of *Roffman* and *Meyers*, and further in view of *Border*; and claims 8, 9, 15, 16, 18, and 19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Umetani* in view of *Roffman* and *Meyers*, and further in view of *Yoshihiro*. The deficiencies of *Umetani*, *Roffman*, *Oomen*, and *Meyers* are discussed above.

The Examiner relies on *Border* for allegedly disclosing that "it is known in the art to make microlens molds having diameters down to the micron sized range (paragraph [0005, 0049])" (*Final Office Action*, p. 6, ll. 5-7); and *Yoshihiro* for allegedly disclosing "controlling the cutting relative to the orientation of the diamond and controlling the rake angle . . ." (*Id.* at p. 6, ll. 19-21). Such teachings, even if present in *Border* and *Yoshihiro*, however, fail to teach or suggest, *inter alia*,

> [a] method of forming a die surface . . . , the method comprising the steps of: bringing a cutting tool to come in contact with a material so as to cut the material . . . ;
>
> wherein the material is one of a ceramic and a tungsten carbide cobalt alloy and has a hardness not smaller than Rockwell hardness HRA 80 or Vickers hardness Hv 1000 and the cutting step is conducted to cut the material with a cutting-in depth of 1 μm or less, and
>
> wherein the cutting tool has a cutting edge capable of coming in contact with the material, the cutting edge comprises a diamond and the cutting step is conducted while the cutting tool is set such that a single point of the cutting edge comes in contact with the material as a cutting point, and the cutting point of the cutting edge is fixed at the single point (emphases added).

as required by claim 1 (emphases added).

Therefore, *Umetani*, *Roffman*, *Oomen*, *Border*, *Meyers*, and *Yoshihiro* fail to teach or suggest all of the limitations of claim 1, and claims 6, 8, 9, 15, 16, 18, and 19 are therefore patentable over *Umetani*, *Roffman*, *Oomen*, *Border*, *Meyers*, and *Yoshihiro* at least due to their dependence from independent claim 1. Applicant therefore requests that the rejection of claims 6, 8, 9, 15, 16, 18, and 19 under 35 U.S.C. § 103(a) be withdrawn.

III. CONCLUSION

Applicant respectfully submits that claims 1, 2, 5, 6, 8, 9, 11-16, 18-24, and 27-31 are in condition for allowance. Applicant therefore requests reconsideration of the application, and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

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